Antinol®
Case Study
Contest

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Case Report : Use of PCSO-524® (Antinol)® for treatment of Obsessive-Compulsive Disorders (OCD) in Domestic Short Hair Cat

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Abstract

A 3 years old domestic short hair cat had shown behavioral disorder after castration 4 months ago. Failure to control pain and inflammation after the operation could induce maladaptive pain and misbehavior. The cat had decreased water and diet consumption, failed to urinate in designated area, rubbed his face with surrounding objects, started destructive chewing, and showed sign of depression, anxiety, aggression, excessive grooming and scratching. Inflamed skin was observed at head, neck, back and legs with skin flaking especially at the medial right hind limb where a bruise was also found. The clinical signs were consistent with obsessive-compulsive disorders (OCD). Pathological examination found edema of epidermis andinfiltration of mature mast cells in hair follicle. Treatment with PCSO-524® (Antinol)® for 180 days had shown that the misbehavior was improved due to decreased pain and skin inflammation. Healthier coat and skin appearance was noticed after 30 consecutive days of PCSO-524® (Antinol)® intake. Pathological follow-up showed less inflammation of epidermis and decreased mast cells infiltration. It was shown that PCSO-524® (Antinol)® could reduce pain and inflammation that caused anxiety and consequently OCD in cats. Additional effects included antihistamine, antiallergy, and skin neurishing. The extract is appropriate for long-term use as it has been shown that 180 days intake was effective without causing abnormality of hematology and blood chemistry indicators such as ALT, creatinine, and BUN. In this case we found that OCD had re-emerged after termination of PCSO-524® (Antinol)® or replacing the supplement with other neutraceuticalsubstance such as Krill oil 425 mg.

Keywords: Cat, PCSO-524® (Antinol)®, obsessive-compulsive disorders (OCD)

Introduction

Obsessive-compulsive disorders (OCD) is a reaction to unknown stimulus that can change regular behavior of animals. The frequency of misbehaviors increased accordingly to duration of the exposure and eventually the misbehaviors can take place of regular behaviors. The misbehaviors as results of anxiety or excitement include loss of appetite, pica, change of grooming behavior and social interaction, failed house-training, and territorial marking. Behaviors that are apparently noticed are excessive grooming, barbering, feline hyperesthesia, self-mutilation, tail chasing, pica, wool and fabric chewing, and wool suckling. However, these behaviors may not be the direct symptoms of OCD (Frank, 2001). Since physical etiology of this disease is unknown, the diagnosis relies upon case history and ruling out other diseases that have similar symptoms. There is no laboratory technique that would contribute to the diagnosis neither.

Correction of the emerged misbehaviors is more effective if started as early as possible. The owners also are required to spend more time with their pets to adjust the unwanted behaviors. Failure to early treatment, behavior of the animals may be irreversibly changed. Use of anti-depressant for at least 12 weeks is recommended to control the misbehaviors (Frank, 2001)

Case history

The case was a neutered male domestic short hair cat aged 3 years old, 4.9 kg. The cat was a stray and adopted by the current owner when he was 2 weeks old. It has been living indoors with the family without children and was the only cat in the house. Commercial diet was fed. Vaccination included rabies, feline panleukopenia, and feline calicivirus was provided annually. The cat was brought to the veterinary hospital due to depression, decreased water and diet consumption, rubbing his face and body with surrounding objects, excessive grooming, scratching, hair loss, skin flaking, and inflamed skin particularly where severe licking and scratching occurred. Bruised cause by licking and scratching were found behind right ear and the medial aspect of right hind limb.

The cat was treated previously by another veterinary clinic for Aspergillus spp. infection. Itraconazole, amoxy-clavulanic acid, and hydroxyzine dihydrochloride were administered continuously for 4 months without any improvement. Misbehaviors of the cat included aggression, destructive chewing especially plastic bag, isolation and dissociative from the owner, hiding behind cabinet or under table. The owner informed that the misbehaviors were emerged after 10 days of admission at the veterinary clinic for neutering. The change was more frequent and getting worse, particularly the aggression, self-mutilation, eating plastic bag, and biting. The owner tried applying cat pheromone spray and prescribed medication from the veterinary clinic but only slight change of aggression and no improvement of other misbehaviors were observed.

Physical examination

Physical examination showed 101.2 oF body temperature, 3/5 body condition score, dilated pupil, 5% dehydration, decreased skin elasticity, hair loss, and inflammation at the back of right ear, right facial area, and medial aspect of right hind limb, where skin bruise was most apparent. The cat was anxious and did not cooperate with the palpationand restraint. The cat showed skin hyperesthesia of the back. Skin flaking was found behind the right ear.

Differential diagnosis

Tentative diagnosis included ectoparasite infestation, epilepsy, allergic skin disease, pain, hyperthyroidism, central nervous system (CNS) pathology, and obsessive-compulsive disorder.

Diagnostic plan and results

Skin examination

Physical appearance of the skin was examined at forehead, head, right area of the neck, and medial right hind limb. Hair loss, redness, abrasion, and skin thickening were found that the forehead, head, right area of the neck. Hair loss, edema, bruise, saliva stain and wet coatwere found at the medial right hind limb. (Figure 5)

Skin scraping did not find ectoparasites. Examination of skin cell using Scotch tape technique and dip quick staining found exfoliative dermatitis but found no yeast or bacteria (Figure 1). Dermatophyte test media culture was negative. Histopathological examination from skin biopsy of medial right hind limb showed mild epidermal hyperplasia and irregularly increased and cross-arrangement of collagen and reactive fibroblast. There was infiltration of mature mast cells in hair follicles. The cat was scheduled for follow-up every 3 days until improvement was noticed.

Hematological, clinical chemistry and urinary examination

Hematological test showed increased white blood cell count and hematocrit, and normal blood parameters (Table 1). Clinical chemistry test detected higher than normal level of creatinine and blood urea nitrogen (BUN), which indicated azotemia (Table 2). Leukemia virus test kit and feline immunodeficiency virus test showed negative result. Thyroid hormone was normal (1.45 mcg/dl). Treatment plan included correction of dehydration to eliminate azotemia and repeating blood test to confirm prerenal azotemia. Monitoring of PCSO-524® (Antinol)® adverse effect was performed by hematological and clinical chemistry test.

Urinary examination prior to the treatment showed normal results. Dark yellow urine, 1.053 specific gravity, 5 pH, 1+ protein, 1+ leukocytes, -glucose, -ketone, and 0.3 urine protein/creatinine ratio were detected. Urine collection was feasible only once and was prior to the treatment, so there was no repeated examination after PCSO-524® (Antinol)® administration.

Assessment of misbehaviors

The cat had anxiety, was growling and aggressive while being restrained, and failed to control urination while in pet carrier. Excessive licking at the right thigh and constantly rubbing head on the pet carrier were observed. Additional information was from the owner that had observed the cat's behavior at home since some misbehaviors were not expressed during the examination by veterinarian. Behaviors common for obsessive-compulsive disorders (OCD), i.e., aggression, self-mutilation, eating plastic bag, isolation, house training disorder, excessive grooming, head and back rubbing on surrounding objects were focused in order to plan the appropriate treatment.

Treatment outcome and follow up

PCSO-524® (Antinol)® was prescribed to reduce inflammation and pain and to strengthen the skin condition. Induction dosesimilar to dosage for a small dog weighted less than22 kg was applied so 1 capsule bid for 14 days was given then reduced down to maintenance dose, 1 capsule sid (Soontornvipart, 2012).

The treatment was divided into 3 phases, first 1-14 days, 15-30 days, and 31-180 days, respectively. The owner was asked to assist in the preliminary diagnosis (Table 1). Treatment outcome was monitored and assessed for improvement during each phase using behavior observation, skin test, hematological and clinical chemistry test.

Treatment plan for day 1-14

Dehydration was treated by infusion of 300 ml Acetaronce a day to adjust the pre-renal azotemia. PCSO-524® (Antinol)® was given at the induction dose, 1 capsule bid. Feline pheromone (Feliway®) was sprayed twice daily. Elizabethan collar was installed while the owner was not home and during the night. Wound dressing was scheduled daily for wounds at the head neck, right hind limb and biopsy spot. Amoxy-clavulanic acid 13.75 mg/kg bid was given until suture removal on day 10. The owner was requested to spend time with the cat at least 1-2 hours per day and kept body cleaning when arriving home,no matter with exposure to other animals outside.

Treatment outcome during day 1-14

Observation of behavior showed that the cat started to gain water and food appetite on day 3 after administration of PCSO-524® (Antinol)®. The misbehaviors had been improved. On day 10, the cat started to show less aggression and allowed the owner to pet or restrain but not the others especially during the examination. Using litter box, no face rubbing, less isolation but still hiding under the table or bed,less frequency of licking of medial right hind limb, normal body grooming, destructive chewingand eating plastic bag when the owner not presented were noticed (Table 2 and 4).

Skin examination on day 3 of the treatment found less inflammation and more dry crust at the forehead, head, and upper right neck. The examination also found less hair loss and less bruise at the medial right hind limb, but saliva stain and skin exudate still existed. The biopsy wound was clean and dry (Figure 6). On day 7, dryer lesion and crust detachment were noticed. Signs of skin inflammation were disappeared. Lesion at the medial right hind limb was dry without crust and the biopsy wound was clean and dry (Figure 7). On day 10, there was less crust on the forehead, head, and upper right neck but the lesion was dryer. Signs of skin inflammation disappeared. Lesion at the medial right hind limb was dry without crust. The biopsy wound was intact after the suture was removed (Figure 8 and Table 3).

On day 7, blood tests showed normal white blood cell count (Table 5), normal creatinine and BUN (Table 6). Dehydration disappeared so fluid therapy was terminated on day 7. Antibiotic administration was discontinued on day 10.

Treatment plan for day 15-90

Maintenance doseof PCSO-524® (Antinol)®, 1 capsule every 24 hour, was prescribed. Feline pheromone (Feliway®) was sprayed twice daily. Elizabethan collar was installed only when the owner observed excessive grooming. Monitoring of misbehaviors continued.

Treatment outcome during day 15-90

Water and diet intake was normal. The aggression was apparently less expressed after day 30. The cat started snuggling up with the owner and stopped hiding but showed aggressive resistance when being restrained. Other behaviors included using litter box, normal grooming, and chewing plastic bag (Table 2 and 4).

Skin examination found no lesion remained on forehead, head, upper right neck and medial right hind limb. Hair growth was noticed but new hair on the head and forehead was darker (Figure 9 and Table 3).

Histopathological test of skin biopsy specimen collected from medial right hind limb at day 30 showed thinner epidermis, moderate edema of dermis, and less infiltration of mature mast cell in mature follicles (Figure 3). ALT, creatinine, and BUN were normal (Table 5 and 6).

Treatment plan for day 91-180

Maintenance doseof PCSO-524® (Antinol)®, 1 capsule every 24 hour, was prescribed. Feline pheromone was discontinued. Elizabethan collar was installed only when the owner observed excessive grooming. Monitoring of misbehaviors continued.

Treatment outcome during day 91-180

Water and diet intake was normal. The aggression was apparently less expressed after day 30. Snuggling up with the owner, no hiding, no aggression even when being restrained, using litter box, normal grooming, chewing plastic bag and contamination of plastic in feces were observed (Table 2 and 4).

Skin examination found no lesion remained on forehead, head, upper right neck and medial right hind limb on day 180. New hair was shiny and soft throughout the body (Table 3).

Histopathological test of skin biopsy specimen collected from medial right hind limb at day 180 showed thinner epidermis, and less infiltration of mature mast cell (Figure 4). ALT, creatinine, and BUN were normal (Table 5 and 6).

Outcome of PCSO-524® (Antinol)® termination

Since the treatment outcome after 180 days was satisfied in behavior, skin, and blood chemistry aspects, the owner decided to discontinue the medication after day 210. The following misbehaviors had re-emerged within 7 days of termination; excessive grooming, face rubbing, destructive chewing and not using litter box for urination. Hiding was not noticed this time, but there were new misbehaviors such as running into objects and meowing at night. The misbehaviors had disappeared after PCSO-524® (Antinol)® was given again at the induction dosage for 10 days.

Fifteen days after PCSO-524® (Antinol)® was discontinued, skin examination showed inflammation of skin of the right ear lobe from face rubbingbut no otitis. Saliva stain was found at the medial side of both hind limbs with little inflammation and hair loss from hair chewing (Figure 11). The lesion, especially the inflammation, gradually disappeared after PCSO-524® (Antinol)®was given at the induction dosage for 5 days. Dosage of PCSO-524® (Antinol)® was then reduced after 14 days of the treatment.

Outcome of PCSO-524® (Antinol)® termination and administration of Krill oil 425 mg

When PCSO-524® (Antinol)® at the maintenance dose was discontinued by decision of the owner, Krill oil 425 mg was given by the owner even though the cat's condition was satisfied at that point. After 15 days of Krill oil supplementation, excessive grooming, face rubbing, not using litter box for urination, licking lateral side of right hind limb, and hiding were observed. Aggression and hissing and resistance to restraint were observed after Krill oil was given for 30 days. When the treatment was replaced with PCSO-524® (Antinol)® at the induction dose again, the misbehaviors were improved after 20 days.

Thirty days after PCSO-524® (Antinol)® was discontinued, skin examination showed scattered lesion all over the body including inflammation and saliva of ventral abdomen, paw inflammation, saliva stain on lateral side of right hind limb, broken nail of all paws and hair loss from hair chewing (Figure 12). The owner informed that all the lesions started to emerge about 1 week after the misbehaviors were noticed. The lesions had disappeared after PCSO-524® (Antinol)®was given at the induction dosage for 14 days. Dosage of PCSO-524® (Antinol)® was then reduced after 15 days of the treatment.

Discussion

Obsessive-compulsive disorders (OCD) is a reaction to unknown stimulus and can alter regular behavior of animals. The frequency of misbehaviors increased accordingly to duration of exposure and eventually the misbehaviors can take place of regular behaviors. The misbehaviors as results of anxiety or excitement include loss of appetite, pica, change of grooming behavior and social interaction, failed house-training, and territorial marking. Behaviors that are apparently noticed are excessive grooming, barbering, feline hyperesthesia, self-mutilation, tail chasing, pica, wool and fabric chewing, and wool suckling. However, these behaviors may not be the direct symptoms of OCD (Frank, 2001). Since physical etiology of this disease is unknown, the diagnosis relies upon case history and ruling out other diseases that have similar symptoms. There is no laboratory technique that would contribute to the diagnosis neither. Correction of the emerged misbehaviors is more effective if started as early as possible. The owners also are required to spend more time with their pets to adjust the unwanted behaviors. Failure to early treatment, behavior of the animals may be irreversibly changed. Use of anti-depressant for at least 12 weeks is recommended to control the misbehaviors (Frank, 2001)

Post-operative pain control, pain control after castration in this case, is very important since acute pain caused by the operation can induce adaptive pain as a mechanism of self-protection. The adaptive pain is, for example, nociceptive pain that is caused by stimulation of nociceptor or free nerve ending and inflammatory pain that is the result of stimulation of pain receptor by transmitters increased during the inflammation, such as prostaglandins (PGs) and bradykinin (BK). If adaptive pain continues, it will become chronic pain. Cats express chronic pain differently from dogs, particularly often show aggression and decreased response to pain killer. Response to chronic pain changes adaptive pain into maladaptive pain that continuously stimulate dorsal horn neuron. If pain is not eliminated within 3 months, pain at regular level can be at extreme level in affected animals. Misbehaviors such as aggression, isolation, being unfriendly to other cats in the house, loss of appetite usually emerged. The pain could be the cause of OCD in this cat since the maladaptive pain was not treated in the first place. The previous treatment for 4 months was focused on skin disease using antibiotic, antifungal and anti-itching.

OCD requires a long term treatment especially in animals with renal disorders or misdiagnosis. Some OCD medications can be at risk in animals with renal azotemia. Long term use of anti-inflammatory drugs, either steroids or NSAIDs, can be harmful to animals. A clinical study shows that when NSAIDs is used to prohibit the function of COX enzyme, it can damage kidney due to prostanoids from COX that have physiological effect on the kidney. (Suemanotham, 2014).

PCSO-524® (Antinol)® is extracted from New Zealand green-lipped mussel (Pernacaniculus). There is a report that it can prevent and reduce inflammation. Other effects include gastroprotective effect, antihistamine, antioxidant, anticytokines, and antiarthritis (Coulson et al., 2015). In this study we found that it could reduce inflammation, edema of epidermis, and infiltration of mast cells in hair follicles, which may be contributed by its antihistamine effect (Figure 2, 3 and 4).

OCD in cats has no specific cause although stress in one of the most well-known etiology of the disease (Frank, 2001). Inflammation and pain could stimulate stress in humans and animals. The response varies and, in cats, depending on breeds especially those that are independent and short hair breeds such as Burmese cat, Siamese cat and cats of the eastern world. Cats may show signs of wool-suckling and self-mutilation more than usual (Boven, J., 2005). Specific treatment of the condition is none since the cause is unknown. Most common treatments include medication and adjusting behavior. The best prevention scheme is not to cause stress in cats. Therefore PCSO-524® (Antinol)® is appropriate since it can reduce inflammation and pain that lead to stress in cats. It was confirmed in this case when PCSO-524® (Antinol)® was stopped and the cat started showing misbehaviors after 15 days.

Although PCSO-524® (Antinol)® was used for a long-term treatment in this case, hematological and clinical chemistry parameters were normal (Table 4 and 5). This strengthen the indication that PCSO-524® (Antinol)® is safe to use in cats. There is a study that used PCSO-524® (Antinol)® at double and triple dose of what recommended for 4 weeks to treat degenerative joint disease and found no adverse effects on ocular and neuromuscular system. Additionally, the cat in that study showed no change of behavior, and healthier skin and coat (Pusoonthornthum, 2017). This agrees with our study that the cat showed soft and shiny coat after being treated for 180 days. The cat in this study had responded clinically well to PCSO-524® (Antinol)® treatment. When the treatment was replaced with other neutraceutical, Krill oil 425 mg, that also had anti-inflammatory and skin nourishing effects, the response could not be compared with that of PCSO-524® (Antinol)®.

Conclusion and take-home message

PCSO-524® (Antinol)® is appropriate for treatment of OCD in cats. The anti-inflammatory, pain control and antihistamine effects can reduce stress caused by pain. The indirect effects include nourishing skin and coat. It is also safe for long-term use.

Since OCD has no exact cause and cannot be detected by laboratory examination, attentiveness and observation of behavior by the owner is most important other than the diagnosis. Treatment does not only requires medication, but cooperation from veterinarian, owner, and the animal as well. Treatment at the early stage of the disease gives better outcome compared to treatment given when the condition is chronic.

Prevention of OCD includes post-operative pain management. If the veterinarian does not aware of this, it could induce maladaptive behavior and eventually lead to OCD particularly in breeds that are at risk such as Burmese and Siamese cats.

Figures and Tables

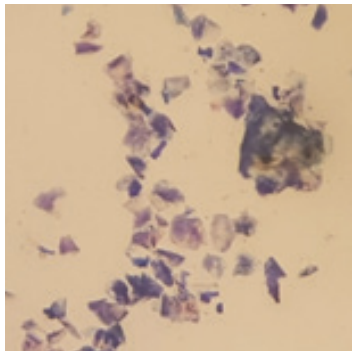

Figure 1. Skin specimen processed with dip-quick stain on the first day of examination showing exfoliation of skin cells but no yeast or bacteria was found.

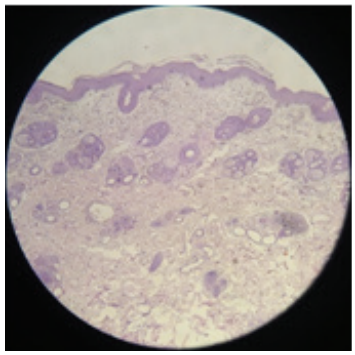

Figure 2. Histopathological examination of skin biopsy specimen collected from medial right hind limb before the treatment showed hyperplasia and increase of collagen and reactive fibroblast that were disorderly lined and crossed. Infiltration of mature mast cells in hair follicles was found.

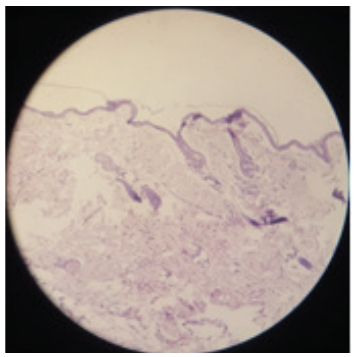

Figure 3. Histopathological examination of skin biopsy specimen collected from medial right hind limb after 1 month of the treatment showed thinner epidermis, moderate edema of dermis and little infiltration of mature mast cells.

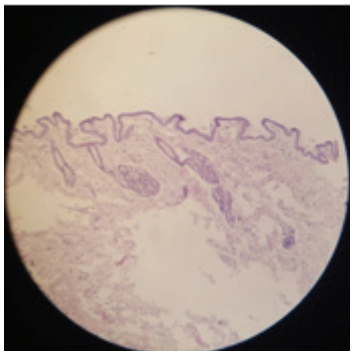

Figure 4. Histopathological examination of skin biopsy specimen collected from medial right hind limb after 6 months of the treatment showed thinner epidermis and little infiltration of mature mast cells.

Figure 5. Images of forehead, head, upper right neck, and medial right hind limb before the treatment showed hair loss, inflammation, abrasion, and crust at the forehead, head, upper right neck. Hair loss, edema, bruise, saliva stain and exudate were found at the medial right hind limb.

Figure 6. Images of forehead, head, upper right neck, and medial right hind limb after 3 days of treatment showed dryer and less inflamed lesion with plenty of dry crust at the forehead, head, upper right neck. Hair loss, less bruise, saliva stain and little exudate were found at the medial right hind limb.

Figure 7. Images of forehead, head, upper right neck, and medial right hind limb after 7 days of treatment showed dryer lesion and crust detachment at the forehead, head, upper right neck. Signs of skin inflammation were disappeared. Lesion at the medial right hind limb was dry without crust and the biopsy wound was clean and dry

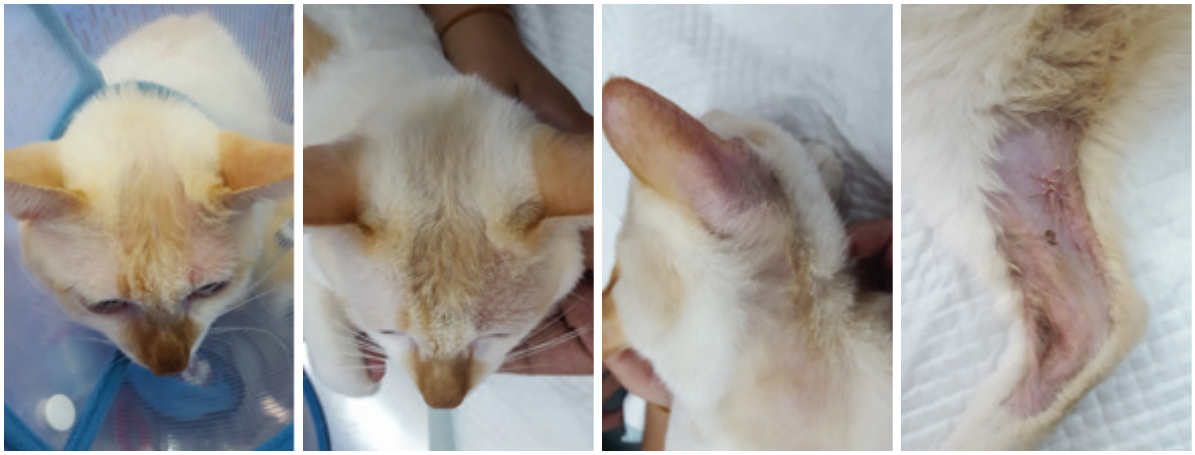

Figure 8. Images of forehead, head, upper right neck, and medial right hind limb after 10 days of treatment showed less crust on the forehead, head, and upper right neck but the lesion was dryer. Signs of skin inflammation were disappeared. Lesion at the medial right hind limb was dry without crust. The biopsy wound was intact after the suture was removed.

Figure 9. Images of forehead, head, upper right neck, and medial right hind limb after 30 days of treatment showed disappearance of all the lesions. Hair growth was observed. The new hair was darker at the head and forehead.

Figure 10. Images of forehead, head, upper right neck, and medial right hind limb after 180 days of treatment showed disappearance of all the lesions. Skin was soften and coat was shiny.

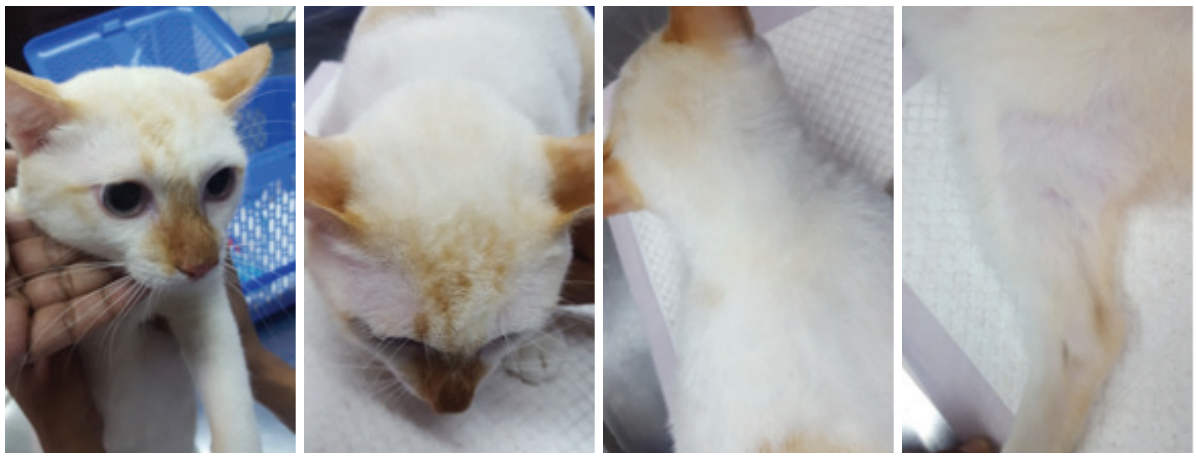

Figure 11. Images of forehead, head, upper right neck, and medial right hind limb after 210 days of treatment and the treatment was discontinued for 15 days showed inflammation of skin of the right ear lobe from face rubbingbut no otitis. Saliva stain was found at the medial side of both hind limbs with little inflammation and hair loss from hair chewing. The lesions, particularly the inflammation, disappeared 5 days after PCSO-524® (Antinol)®was given again.

Figure 12. Skin lesion when Krill oil 425 mg was given for 30 days as a replacement of PCSO-524® (Antinol)® starting at day 270. There was inflammation on paws, abrasion on lateral hind limb surrounded by saliva stain, broken nail of all paws, and hair loss from hair chewing.

Table 1. Plan for treatment of Obsessive-Compulsive disorders (OCD) using PCSO-524® (Antinol®)

Treatment	Day 1-14	Day 15-90	Day 91-180
Fluid therapy	Yes	No	No
PCSO-524®(Antinol®) induction dose	Yes	No	No
PCSO-524®(Antinol®) maintenance dose	No	Yes	Yes
Feline pheromone spray	Yes	Yes	No
Elizabethan collar*	Yes	Yes*	Yes*
Spending time with owner	Yes	Yes	Yes
Pathological examination	Yes	Yes	Yes
Blood analysis	Yes	Yes	Yes
Behavior observation	Yes	Yes	Yes

* Only when excessive grooming was observed

Table 2. Symptoms and behaviors of the cat

Symptoms/Behavior	Treatment with PCSO-524®*				After termination of PCSO-524®**	Treatment with Krill oil***
	Day 0	Day 1-14	Day 15-90	Day 91-180		
Appetite	No	No / Yes	Yes	Yes	No / Yes	Yes
Aggression	Yes	No / Yes	No / Yes	No	No	No / Yes
Resistance to restraint	Yes	No / Yes	No / Yes	No	Yes	No / Yes
Anxiety/hissing	Yes	No / Yes	No	No	Yes	No / Yes
Pain on right hind limb when palpated	Yes	No	No	No	No	No
Hyperaesthesia	Yes	No / Yes	No	No	Yes	Yes
Excessive grooming	Yes	No / Yes	No	No	Yes	Yes
Body rubbing	Yes	No / Yes	No	No	Yes	No / Yes

*Induction dose, I capsule bid, on day 1-14, maintenance dose, 1 capsule sid after day 14

**15 days after PCSO-524®was discontinued on day 210

***1 month after PCSO-524®was discontinued and replaced by Krill oil 425 mg

Table 3. Skin lesion after PCSO-524®(Antinol®) treatment

Lesion	Treatment with PCSO-524®*				After termination of PCSO-524®**	Treatment with Krill oil***
	Day 0	Day 1-14	Day 15-90	Day 91-180		
Hair loss	Yes	Yes	No	No	Yes	No
Flaking	Yes	Yes	No	No	Yes	No
Severe inflammation	Yes	No / Yes	No	No	Yes	Yes
Severe bruise	Yes	No / Yes	No	No	Yes	Yes
Saliva stain	Yes	No / Yes	No	No	Yes	No / Yes
Itching	Yes	No / Yes	No	No	Yes	No / Yes
Soft skin/Shiny coat	No	No	Yes	Yes	Yes	Yes

*Induction dose, I capsule bid, on day 1-14, maintenance dose, 1 capsule sid after day 14
**15 days after PCSO-524® was discontinued on day 210
***1 month after PCSO-524® was discontinued and replaced by Krill oil 425 mg

Table 4. Symptoms of Obsessive-Compulsive disorders (OCD) after treated with PCSO-524® (Antinol®)

Symptoms	Treatment with PCSO-524®*				After termination of PCSO-524®**	Treatment with Krill oil***
	Day 0	Day 1-14	Day 15-90	Day 91-180		
Hypersensitivity	Yes	No / Yes	No	No	No / Yes	No / Yes
Excessive grooming	Yes	No / Yes	No	No	No / Yes	No / Yes
Self-mutilation	Yes	No / Yes	No	No	No /Yes	No / Yes
Wool suckling	No	No	No	No	No	No
Pica	Yes	Yes	Yes	Yes	Yes	Yes

*Induction dose, I capsule bid, on day 1-14, maintenance dose, 1 capsule sid after day 14
**15 days after PCSO-524® was discontinued on day 210
***1 month after PCSO-524® was discontinued and replaced by Krill oil 425 mg

Table 5. Hematological test results after 180 days of PCSO-524® (Antinol®) treatment

Parameter	Unit	Normal range	Before Tx	Day 7	Day 30	Day 60	Day180
RBC	x106/ul	5.5-10	8.1	8.5	6.7	8.4	6.2
Hemoglobin	g/dl	8-15	13.3	13.8	11.4	13.4	10.4
Haematocrit	%	24-45	48	40	33	40	32
Platelet	x103/ul	100-518	269000	212000	216000	232000	228000
WBC	x103/ul	5500-19000	21700	12300	9100	4800	10300
Neutrophils	%	33-75	82	78	75	86	75
Bands	%	0-3	0	0	0	0	0
Eosinophils	%	2-12	3	2	3	1	1
Lymphocytes	%	10-55	14	18	20	11	22
Monocytes	%	1-4	1	2	2	2	2

Table 6. Clinical chemistry test results after 180 days of PCSO-524® (Antinol®) treatment

Parameter	Unit	Normal range	Before Tx	Day 7	Day 30	Day 60	Day180
ALT(SGPT)	U/L	10-100	50	96	62	63	36
BUN	Mg/dL	5-30	31	16	23	19	20
Creatinine	Mg/dL	1.3-2.1	2.5	1.1	1.6	1.6	1.3

References

Boven,J and Heath,S.2005.Feline Compulsive Disorders: Behavior Problems in Small Animal.177-184.

Coulson S,Palacios T and Vitetta L. PernaCaniculus (Green-lipped mussel): Bioactive components and therapeutic evaluation for chronic health conditions. Progress in drug research.2015; 70: 91-132.

Frank, D. 2001. Feline Obsessive-Compulsive Disorders. WORLD SMALL ANIMAL VETERINARY ASSOCIATION WORLD CONGRESS PROCEEDINGS:143-150.

Pusoonthornthum,R. The effects of PCSO-524® extract on vital signs,complete blood count,and blood chemistry in clinically-healthy normal cat.The 10th Veterinary Reginal Congress2017.2017:11.

Soontornvipart, K.2012. The preliminary study of the clinical outcome of using the PCSO-524® polyunsaturated fatty acid compound (Antinol®) in the treatment of canine osteoarthritis and degenerative spinal diseases. http://www.antinol.com/studies/Preliminary_Study_of_the_Clinical_Outcome_After_Using_PCSO-X-Rays.pdf

Suemanotham N. Cyclooxygenase enzymes expression in the kidney.Journal of Applied Animal Science. 2014; 7(3):9-22.

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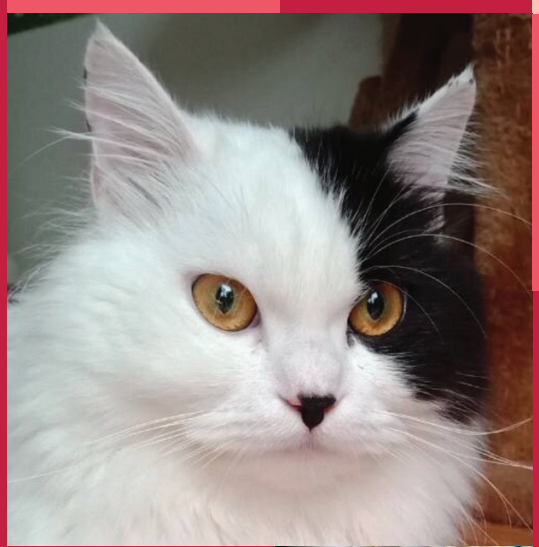

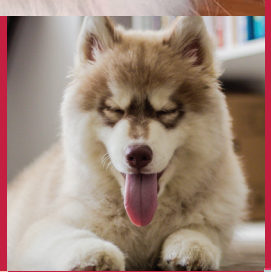

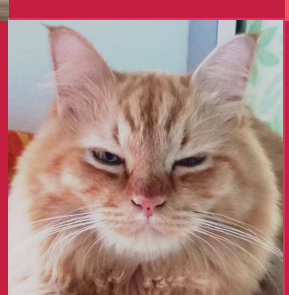

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